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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Esther Breuning

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EXAMINER

WILSON, MICHAEL H

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/561,739	Applicant(s) BREUNING ET AL.	
	Examiner MICHAEL WILSON	Art Unit 1794	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-37 is/are pending in the application.
- 4a) Of the above claim(s) 5-7, 15-21, 25-33 and 35-37 is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-4, 8-14, 22-24 and 34 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____. |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>20051220; 20070802</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Election/Restrictions

1. Restriction is required under 35 U.S.C. 121 and 372.

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1.

In accordance with 37 CFR 1.499, applicant is required, in reply to this action, to elect a single invention to which the claims must be restricted.

Group 1, claim(s) 1-4, 8-14, 22-24, and 34, drawn to a mixture.

Group 2, claim(s) 1-3, 5, 20, 21, and 35, drawn to a mixture.

Group 3, claim(s) 1-3, 6, 7, 35 and 37, drawn to a mixture.

Group 4, claim(s) 25, 26, and 34, drawn to a polymer.

Group 5, claim(s) 27-30, and 36, drawn to a compound.

2. The inventions listed as Groups 1-6 do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: The common feature linking the claims is a bridged carbazole unit or a triplet emitter. Both Bridged carbazoles and triplet emitters are known in the art (Thompson et al. (US 2003/0017361 A1) paragraphs [0020] and [0026])). Therefore unity is lacking *a posteriori* because neither of these features qualify as a special technical feature.

3. During a telephone conversation with Ashley Pezzner on 16 August a provisional election was made with traverse to prosecute the invention of group 1, claims 1-4, 8-14, 22-24, and 34. Affirmation of this election must be made by applicant in replying to this Office action. Claims 5-7, 15-21, 25-33, and 35-37 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

4. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Claim Objections

5. Claims 4-7 and 14 are objected to because of the following informalities: The claims refer to claim 3 twice. The second recitation of claim 3 is redundant given that the claims are already dependent on claim 3.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claims 4 and 8 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 4, the recitation of "COMP 1" renders the claim indefinite because it is unclear what is meant by the phrase and what emitters are encompassed by it.

Regarding claim 8, the scope of the claim is indefinite because the claim is a dependent claim which fails to cite the claim number from which it depends. For the purposes of this action claim 8 is interpreted as depending from claim 4.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

9. Claims 1-4, 8, 11-14, 22-24, and 34 are rejected under 35 U.S.C. 102(e) as being anticipated by Roberts et al. (US 200/0062930 A1).

Regarding claim 1, Roberts et al. disclose a mixture (blend) comprising at least one conjugated polymer [0007], a bridged carbazole unit ([0086]-[0087], structure XCII), and a triplet emitter [0161].

Regarding claims 2 and 3, Roberts et al. disclose all the claim limitations as set forth above. Additionally, the reference discloses mixtures within the claimed ranges [0163]. The disclosed ranges correspond to approximately 40-95% by weight of at least one conjugated polymer, 7.5% (0.1*75) or less of at least one bridged carbazole unit and 0.05-10% by weight of at least one triplet emitter [0163].

Regarding claim 4, Roberts et al. disclose all the claim limitations as set forth above. Additionally, the reference discloses mixtures within the claimed ranges [0163]. The disclosed ranges correspond to approximately 40-95% by weight of a conjugated polymer, which contains 7.5% (0.1*75) or less of a bridged carbazole unit of instant formula (I) ([0086]-[0087], structure XCII), and 0.05-10% by weight of at least one triplet emitter [0163].

Regarding claims 8 and 34, Roberts et al. disclose all the claim limitations as set forth above. Additionally, the reference discloses wherein the bicarbazole unit is incorporated into the polymer via the 2, 7 -position and is a bicarbazole unit with the structure of instant formula (IV) ([0086]-[0087], structure XCII).

Regarding claim 11, Roberts et al. disclose all the claim limitations as set forth above. Additionally, the reference discloses wherein further structural elements of the polymer are selected from the groups meta- or para-phenylenes, 1,4-naphthylenes, fluorenes, or indenofluorenes ([0065] pages 6-8 and [0083]).

Regarding claim 12, Roberts et al. disclose all the claim limitations as set forth above. Additionally, the reference discloses wherein further structural elements which improve charge transport ([0085]-[0086]).

Regarding claim 13, Roberts et al. disclose all the claim limitations as set forth above. Additionally, the reference discloses wherein further structural elements are selected from the groups of the triarylaminines ([0087] structures XCIII to XCVI) or the oxadiazolylenes ([0073] structures LV to LVII, LIX, LXII, and LXIV to LXVII).

Regarding claim 14, Roberts et al. disclose all the claim limitations as set forth above. Additionally, the reference discloses wherein the bicarbazole unit is incorporated into the polymer via the 2, 7 -position, R is biphenyl, and n is 0 ([0086]-[0087], structure XCII).

Regarding claim 22, Roberts et al. disclose all the claim limitations as set forth above. Additionally, the reference discloses wherein any further molecules, which may be low molecular weight, oligomeric, or polymeric, may also be added to the mixture [0163].

Regarding claim 23, Roberts et al. disclose all the claim limitations as set forth above. Additionally, the reference discloses wherein a compound of instant formula (II) is added to the mixture ([0391], CBP = bicarbazole-biphenyl).

Regarding claim 24, Roberts et al. disclose all the claim limitations as set forth above. Additionally, the reference discloses wherein the total bicarbazole content is within the claimed range [0163]. The total content based on combining the weight of

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bicarbazole polymer units and the weight of CBP is approximately 57% by weight or less [0163].

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

12. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Roberts et al. (US 200/0062930 A1) as applied to claim 4 above and in view of Maxted et al. (WO 03/074628 A).

Regarding claim 9, Roberts et al disclose all the claim limitations as set forth above. Additionally, the reference discloses wherein the bicarbazole unit is incorporated into the polymer via the 2, 7 -position ([0086]-[0087], structure XCII). However the reference does not disclose the bicarbazole unit bound via the 3, 3'-position.

Maxted et al. teach a similar charge transporting polymer comprising a bicarbazole unit (page 9, compound KLCBP1). The reference teaches the bicarbazole may be bound via the 3, 3'-position.

It would be obvious to one of ordinary skill in the art at the time of the invention to connect the bicarbazole unit of Roberts via the 3, 3'-position, as taught by Maxted et al., in the polymer of Roberts et al. One of ordinary skill would reasonably expect such a polymer to have similar properties and be suitable for the same purpose given that Maxted et al. 3, 3'-bound bicarbazole units as suitable for charge transfer polymers (page 9, first full paragraph), suitable for use in electroluminescent devices (abstract). One of ordinary skill would be motivated by a desire to optimize the physical properties of the polymer as the specific connectivity of a polymer is known to directly affect the physical properties of the material.

13. Claims 1, 3, 4, and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sohn et al. (US 2002/0093005 A1) in view of Thompson et al. (US 2003/0017361 A1).

Regarding claims 1, 3, 4, and 10, Sohn et al. disclose a conjugated polymer comprising a carbazole unit (abstract). Where n is two or more the polymer forms a bicarbazole unit meeting instant formula(I) wherein R is two phenyl and one vinyl groups, and the bicarbazole is bound to the polymer via the R bridge. The reference also discloses that the polymer is emissive and charge transporting [0008]. However the reference does not explicitly disclose a triplet emitting mixed with the polymer.

Thompson et al. teaches using phosphorescent compounds a host compound in electroluminescent devices (abstract). The reference teaches using a phosphorescent compound can improve luminescent efficiency [0016].

It would be obvious to one of ordinary skill in the art at the time of the invention to combine the phosphorescent compound of Thompson et al. with the polymer layer of Sohn et al. One of ordinary skill would reasonably expect such a combination to be suitable given that Thompson teaches the host compound may be an emissive charge transporting compound [0026]. One of ordinary skill would be motivated by a desire to improve luminescent efficiency.

Conclusion

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MICHAEL WILSON whose telephone number is (571) 270-3882. The examiner can normally be reached on Monday-Thursday, 7:30-5:00PM EST, alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Callie Shosho can be reached on (571) 272-1123. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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15. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

MHW

/Callie E. Shosho/
Supervisory Patent Examiner, Art Unit 1794